

U.S. Department of Energy
Technical Qualification Program

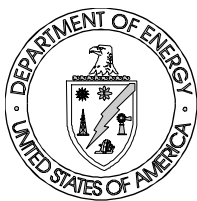
Emergency Management Topical Area

Study Guide

For the

***EH Resident
Qualification Standard***

May 1996



Competency 1.28 EH Residents shall demonstrate a familiarity level knowledge of the safety hazards associated with means of egress.

1. Supporting Knowledge and Skills

- a. Discuss the requirements for exits.
- b. Discuss the following elements of an Emergency Action Plan:
 - Escape procedures and routes
 - Employee accountability
 - Means of reporting emergencies
 - Persons to contact for information
- c. Describe the requirements for the following elements of an Emergency Action Plan:
 - Staging areas
 - Alarms
 - Postings
 - Drills and training

2. Self-Study Activities (corresponding to the intent of the above competency)

NOTE: • Below are two web sites containing many of the references you may need.

Web Sites		
Organization	Site Location	Notes
Department of Energy	http://cted.inel.gov/cted/index.html	DOE Standards, Guides, and Orders.
U.S. House of Representatives	http://law.house.gov/cfr.htm	Searchable Code of Federal Regulations

Read Sections 1910.35, Definitions, and 1910.36, General Requirements, page 33, of Subpart E, Means of Egress, of 29 *Code of Federal Regulations* (CFR) 1910, “Occupational Safety and Health Standards for General Industry.”

EXERCISE 1.28-A Referring to 29 CFR 1910.35, define “means of egress.”



EXERCISE 1.28-B Referring to 29 CFR 1910.35, define “exit.”

EXERCISE 1.28-C Referring to 29 CFR 1910.36, what is the primary requirement for exits?

Read Section 1910.38, Employee Emergency Plans and Fire Prevention plans, and the appendix to Subpart E, Means of Egress, Employee Emergency Plans, pages 35-36, of 29 CFR 1910, “Occupational Safety and Health Standards for General Industry.”

EXERCISE 1.28-D Referring to 29 CFR 1910.38, what are the basic elements of an emergency action plan?

EXERCISE 1.28-E Referring to 29 CFR 1910.38, what are the basic elements of a fire prevention plan?

EXERCISE 1.28-F Referring to 29 CFR 1910, appendix to Subpart E, what is the purpose of designating a safe or refuge area?

EXERCISE 1.28-G Referring to 29 CFR 1910, appendix to Subpart E, what is the “warden,” and what is its function?

EXERCISE 1.28-H Referring to 29 CFR 1910, appendix to Subpart E, what is the purpose of fire prevention housekeeping?

EXERCISE 1.28-I Referring to 29 CFR 1910.38, when must the employer inform the employee about the emergency action plan?

3. Summary

Proper egress from a building or structure will ensure the safety of its occupants during a fire or other emergency. Establishing this process (of proper egress) entails the development of emergency action and fire prevention plans and requiring various safety codes and specifications for buildings and structures to contain exits, fire protection equipment/systems, and other safety features.



4. Exercise Solutions

EXERCISE 1.28-A Referring to 29 CFR 1910.35, define “means of egress.”

ANSWER 1.28-A A means of egress is a continuous and unobstructed way of exit travel from any point in a building or structure to a public way, and consists of three parts: the way of exit access, the exit, and the way of exit discharge.

EXERCISE 1.28-B Referring to 29 CFR 1910.35, define “exit.”

ANSWER 1.28-B An exit is that portion of an egress which is separated from all other spaces in the building or structure to provide a protected way of travel to the exit discharge.

EXERCISE 1.28-C Referring to 29 CFR 1910.38, what is the primary requirement for exits?

ANSWER 1.28-C Every building or structure, new or old, designed for human occupancy shall be provided with exits sufficient to permit the prompt escape of the occupants in case of fire or other emergency.

EXERCISE 1.28-D Referring to 29 CFR 1910.38, what are the basic elements of an emergency action plan?

ANSWER 1.28-D

1. Emergency escape procedures and escape route assignments
2. Procedures for employees to operate critical plant operations before they evacuate
3. Procedures to account for employees after an emergency evacuation
4. Rescue and medical duties of designated employees
5. Preferred means of reporting emergencies
6. Names of persons who can provide additional information regarding this plan



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EXERCISE 1.28-E Referring to 29 CFR 1910.38, what are the basic elements of a fire prevention plan?

- ANSWER 1.28-E
1. A list of workplace hazards, handling and storage procedures, potential ignition sources, control procedures, and available fire protection equipment
 2. Names of the persons responsible for maintenance of the fire protection equipment
 3. Names of the persons responsible for control of fuel source hazards

EXERCISE 1.28-F Referring to 29 CFR 1910, appendix to Subpart E, what is the purpose of designating a safe or refuge area?

ANSWER 1.28-F In the event of an emergency, employees can be evacuated from a danger area to a safe one; once there, the employees can be accounted for.

EXERCISE 1.28-G Referring to 29 CFR 1910, appendix to Subpart E, what is the “warden,” and what is its function?

ANSWER 1.28-G The warden is an employee designated to help move other employees/occupants, in the event of an emergency, away from the danger zone to a safe area.

EXERCISE 1.28-H Referring to 29 CFR 1910, appendix to Subpart E, what is the purpose of fire prevention housekeeping?

ANSWER 1.28-H The purpose of fire prevention housekeeping is to control the accumulation of flammable and combustible waste materials so that a fast developing fire, rapid spread of toxic smoke, or an explosion will not occur.

EXERCISE 1.28-I Referring to 29 CFR 1910.38, when must the employer inform the employee about the emergency action plan?

- ANSWER 1.28-I
1. When the plan is developed
 2. When the employee's responsibilities or actions in the plan change
 3. When the plan changes



Competency 2.2 EH Residents shall demonstrate a working level knowledge of Department of Energy (DOE) Order 5000.3B, Occurrence Reporting and Processing of Operations Information.

1. Supporting Knowledge and Skills

- a. State the purpose of DOE Order 5000.3B, Occurrence Reporting and Processing of Operations Information.
- b. Define the following terms:
 - Event
 - Condition
 - Facility
 - Notification Report
 - Occurrence Report
 - Reportable occurrence
- c. Discuss the Department's policy regarding the reporting of occurrences as outlined in DOE Order 5000.3B, Occurrence Reporting and Processing of Operations Information.
- d. State the different categories of reportable occurrences and discuss each.
- e. Discuss the notification requirements associated with each of the categories of reportable occurrences. Include any associated time requirements, including, at a minimum:
 - Notification Report
 - 10-Day Occurrence Report
 - Final Report
 - Closing out and verifying Occurrence Reports
 - Processing Occurrence Reports
 - Contractor occurrence reporting procedures
- f. Discuss the general process for preparing and submitting occurrence reports and their follow-up.
- g. Given an occurrence report, determine whether:
 - Review process is adequate
 - Causes are appropriately defined
 - Corrective actions address causes
 - Lessons learned are appropriate
 - Corrective actions are completed



- h. Using an occurrence report involving environment, safety, and/or health, identify and discuss the factors contributing to the occurrence.
- i. Using Attachment 1 to DOE Order 5000.3B, Occurrence Reporting and Processing of Operations Information, discuss the role of the EH Resident in environment, safety, and health-related reportable occurrences.

2. Self-Study Activities (corresponding to the intent of the above competency)

- NOTES:
- The DOE Orders are in a state of transition. Please refer to the following gopher site for a cross reference of new and old Orders:
gopher://VM1.HQADMIN.DOE.GOV:70/00/doemenu1/directiv/251cross.asc
 - Below are two web sites containing many of the references you may need.

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Read DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*.

Read at least two occurrence reports involving facilities at your site. If possible, these should involve the environment, safety, and/or health as at least a contributing factor to the cause of the occurrence.

EXERCISE 2.2-A Define “Reportable Occurrence” and the rationale associated with reporting as identified in DOE Order 5000.3, *Occurrence Reporting and Processing of Operations Information*.

EXERCISE 2.2-B Referring to DOE Order 5000.3, describe three categories of Reportable Occurrences and provide an example of the types of events that could lead to each.

EXERCISE 2.2-C Discuss the time requirements for reporting occurrences.



- EXERCISE 2.2-D Describe the elements of the occurrence report.
- EXERCISE 2.2-E Briefly explain the main purpose of the Occurrence Reporting and Processing System (ORPS).
- EXERCISE 2.2-F Using Attachment I of DOE Order 5000.3B, list the nine groups of categorized occurrences.
- EXERCISE 2.2-G Differentiate between “direct cause,” “contributing cause,” and “root cause.”
- EXERCISE 2.2-H List seven categories of causes.
- EXERCISE 2.2-I Describe the responsibilities of the Facility Manager for occurrence categorization and reporting.
- EXERCISE 2.2-J For the two occurrence reports you reviewed, identify and highlight the root cause and corrective action sections. How will facility management know if the corrective action is actually “correct”?

3. Summary

DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*, establishes a system for reporting of operations information related to DOE-owned or -operated facilities and processing of that information to provide for appropriate corrective action.

The Order describes the requirements for reporting and processing of occurrences related to the operation of DOE-owned or -operated facilities, including occurrences related to safety, health, security, property, operations, or the environment, up to and including emergencies.



4. Exercise Solutions

EXERCISE 2.2-A Define “Reportable Occurrence” and the rationale associated with reporting as identified in DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*.

ANSWER 2.2-A Reportable Occurrences are events or conditions that (1) affect the health and safety of the public, (2) seriously impact the intended purpose of DOE facilities, (3) have a noticeable adverse effect on the environment, (4) endanger the health and safety of workers, or (5) adversely affect national security or the security interests of DOE.

EXERCISE 2.2-B Referring to DOE Order 5000.3B, describe three categories of Reportable Occurrences and provide an example of the types of events that could lead to each.

ANSWER 2.2-B Emergencies - The most serious occurrences; require an increased Alert status for on-site personnel and, in specified cases, for off-site authorities. Types of events that could lead to an emergency include the following:

- a) any unintentional nuclear criticality that results or could result in actual or potential facility damage or release of radioactive material to the environment;
- b) any actual or potential release of material to the environment that results or could result in significant off-site consequences;
- c) any natural or man-made event posing an actual or potential threat to the integrity of the facility that results or could result in significant off-site consequences;
- d) any event in process or having occurred that involves an actual or potential substantial degradation of the level of the safety of the facility which results or could result in significant off-site consequences;
- e) any safeguards or security event that is an actual or potential threat to DOE operations, facilities, or personnel, and results or could result in significant effects on the public health and safety/or on national security; or
- f) any event that requires activation of the site emergency plan.



Unusual Occurrence - A nonemergency event that has significant impact or potential for impact on safety, the environment, health, security, or operations. Types of events that could lead to an Unusual Occurrence include events which do the following:

- a) result in the release of radioactive or hazardous materials above limits established in, or in violation of, safety, environmental, or health requirements defined in Federal permits, Federal regulations, or DOE standards;
- b) present significant internal or external threats to safety, the environment, health protection, or the ability of a facility to operate;
- c) involve significant degradation of safety class equipment or environmental, safety, security, or health conditions;
- d) result in fatalities, exposures to hazardous or radioactive materials or off-site or on-site contamination that do not meet emergency criteria defined in DOE Order 5500.2, but are in excess of regulatory limits, failure of environmental monitoring equipment necessary to demonstrate compliance, failure of safety equipment or systems reducing the capability below a minimum required safety function, or significant delay or cost in operations;
- e) result in the actuation of emergency systems or engineered safety features, except under approved testing;
- f) violate technical safety requirements, or involve an unreviewed safety question;
- g) violate DOE safety requirements, environmental requirements, or result in the loss of control or release of radioactive material above allowable limits;
- h) result in the release of a hazardous substance or material that exceeds a reportable quantity and is not Federally permitted as defined in Attachment I of DOE Order 5000.3B; or
- i) result in failure or significant degradation of administrative controls that are required to ensure safety, security, or environmental protection.

Off-Normal Occurrence - An abnormal or unplanned event or condition that adversely affects, potentially affects, or is indicative of degradation in the safety, security, environmental or health protection performance or operation of a facility. Off-Normal Occurrences are those events which do the following:

- a) result in the release of radioactive or hazardous materials below limits established by Federal permits, Federal regulations, or DOE standards, but must be reported in writing to state or local agencies in other than routine monthly/quarterly reports;



- b) are internal or external threats to safety, security, environmental, or health protection or the ability of a facility to operate;
- c) involve degradation of environmental, safety, security, or health conditions;
- d) result in serious personnel injury or significant lost workdays, personnel contamination, assimilation, exposure, or significant on-site or off-site contamination of hazardous or radioactive materials in excess of administrative limits but within regulatory limits, or degradation of environmental monitoring equipment necessary to demonstrate compliance;
- e) result in violation of safety, environmental, or health administrative limits;
- f) involve operational procedural violations, including maintenance and administrative procedures that have the potential to impact the safety, security, environmental, or health performance or operation of a facility; or
- g) involve discovery of a condition that could prevent the functioning of administrative controls necessary to ensure safety or environmental protection.

EXERCISE 2.2-C Describe the notification requirements for Reportable Occurrences.

ANSWER 2.2-C Emergencies - Oral notification to DOE and off-site authorities of emergencies shall be made within 15 minutes or less of categorization; a written notification report shall be prepared and submitted as soon as practical, but in all cases, before the close of the next business day from the time of categorization.

Unusual Occurrences - Oral notification to DOE shall be made as soon as sufficient information is obtained to indicate the general nature and extent of the occurrence, but in all cases, within two hours of categorization; a notification report shall be prepared and submitted before the close of the next business day from the time of categorization.

Off-Normal Occurrences - Oral notification to DOE is not mandatory; a notification report shall be prepared and submitted before the close of the next business day from the time of categorization.



EXERCISE 2.2-D Describe the required elements of the occurrence report.

ANSWER 2.2-D For every Reportable Occurrence, the Facility Manager shall determine and document the following in the occurrence report:

- a) the significance, nature, and extent of the event or condition;
- b) the cause(s) of the event or condition, including the root cause, as appropriate; and
- c) the corrective actions to be taken to correct the condition and prevent recurrence.

EXERCISE 2.2-E Briefly explain the main purpose of the ORPS.

ANSWER 2.2-E The major purpose of the Occurrence Reporting and Processing System is to provide feedback of safety and operational information identified in occurrence reports to other DOE nuclear facilities.

EXERCISE 2.2-F Using Attachment I of DOE Order 5000.3B, list the nine groups of categorized occurrences.

ANSWER 2.2-F The nine groups of categorized occurrences are listed below:

1. Facility Condition
2. Environmental
3. Personnel Safety
4. Personnel Radiation Protection
5. Safeguards and Security
6. Transportation
7. Value Basis Reporting
8. Facility Status
9. Cross-Category Items

EXERCISE 2.2-G Differentiate between “direct cause,” “contributing cause,” and “root cause.”

ANSWER 2.2-G Direct cause - The cause that directly resulted in the occurrence.

Contributing cause - A cause that contributed to the occurrence but, by itself, would not have caused the occurrence.



Root cause - The cause that, if corrected, would prevent recurrence of this and similar occurrences.

EXERCISE 2.2-H List seven categories of causes.

ANSWER 2.2-H Categories of causes:

1. Equipment/material problem
2. Procedure problem
3. Personnel error
4. Design problem
5. Training deficiency
6. Management problem
7. External phenomenon

EXERCISE 2.2-I Identify the responsibilities of the Facility Manager in occurrence categorization and notification.

ANSWER 2.2-I Responsibilities of the Facility Manager in occurrence categorization and notification include the following:

- Categorization of the occurrence utilizing the facility-specific procedures developed in accordance with DOE Order 5000.3B.
- For oral notification, the Facility Manager shall simultaneously contact the DOE Facility Representative and the Headquarters (HQ) emergency operations center (EOC).
- Preparation and submittal of the notification report and distribution of the report to the DOE Facility Representative and Program Manager.

EXERCISE 2.2-J For the two occurrence reports you reviewed, identify and highlight the root cause and corrective action sections. How will facility management know if the corrective action is actually “correct”?

ANSWER 2.2-J Primarily by monitoring the corrective action or any performance indicators corresponding to this corrective action; also if the occurrence does not “occur” again.



Competency 2.20 EH Residents shall demonstrate a working level knowledge of the requirements for the emergency management system in the following Department of Energy (DOE) Orders:

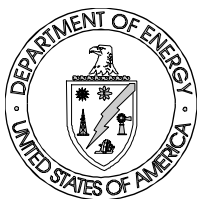
- DOE Order 5500.1B, Emergency Management System
- DOE Order 5500.2B, Emergency Notification, Reporting Requirements
- DOE Order 5500.3A, Reactor and Non-Reactor Nuclear Facilities Emergency Management Planning, Preparedness and Response Program for DOE Operations

1. Supporting Knowledge and Skills

- a. Describe the key elements of Emergency Preparedness including planning, operations, principles, and methods.
- b. Explain the EH Resident's roles and responsibilities in emergency management and response to unplanned events.
- c. Explain the difference between the Occurrence Reporting and Processing System notification requirements and Emergency Management Systems event classification and notification requirements.
- d. Participate in and critique a site emergency exercise.

2. Self-Study Activities (corresponding to the intent of the above competency)

- NOTES:
- The DOE Orders are in a state of transition. Please refer to the following gopher site for a cross reference of new and old Orders:
<gopher://VM1.HQADMIN.DOE.GOV:70/00/doemenu1/directiv/251cross.asc>



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- Below are two web sites containing many of the references you may need.

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Department of Energy	http://cted.inel.gov/cted/index.html	DOE Standards, Guides, and Orders.
U.S. House of Representatives	http://law.house.gov/cfr.htm	Searchable Code of Federal Regulations

Read DOE Order 5500.1B, *Emergency Management System*.

Read DOE Order 5500.2B, *Emergency Categories, Classes, and Notification and Reporting Requirements*.

Read DOE Order 5500.3A, *Planning and Preparedness for Operational Emergencies*.

Scan DOE Order 5000.3A, *Occurrence Reporting and Processing of Operational Information*.

EXERCISE 2.20-A Identify the DOE Order that assigns responsibilities and authorities for the Department's EMS.

EXERCISE 2.20-B Identify the role of the field element in an operational emergency.

EXERCISE 2.20-C Describe the organization and function of the Emergency management team (EMT) at the Headquarters (HQ) level.

EXERCISE 2.20-D Define the term "operational emergency."

EXERCISE 2.20-E Describe the membership and the function of the Emergency Management Advisory Committee (EMAC).

EXERCISE 2.20-F The requirement for establishment of emergency operations centers is found in which DOE Order?



EXERCISE 2.20-G Explain the differences and relationship between “occurrence reporting” and “notification” as contained in DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*, and DOE Order 5500.2B, *Emergency Categories, Classes, and Notification and Reporting Requirements*.

3. Summary

It is the purpose of DOE Orders to establish a framework for the Department's EMS.

DOE Order 5500.1B establishes the overall policy and requirements of the EMS. The Order states that the Under Secretary is the senior official for the EMS and convenes the HQ EMT. The HQ EMT is formed to manage response actions during emergencies involving DOE facilities or requiring DOE assistance. The EMAC is also established by this Order and supports the Director of Emergency Operations (DEO) in the development of specific policy and technical recommendations. Specific responsibilities are spelled out in this Order for Facility Managers, heads of field elements, and HQ Program Secretarial Officers (Program Senior Officials [PSOs]).

DOE Order 5500.2B establishes standard terminology for operational and energy emergencies. Operational emergencies are further classified as an Alert, a Site Area Emergency, or General Emergency according to the severity of the impact of the event. This Order also establishes a reporting requirement for emergency events.

DOE Order 5500.3A establishes the hazards assessment as the technical basis upon which all emergency management programs are developed. The Order states the requirements for planning and preparedness for operational emergencies and describes the 13 elements of an emergency management program.

4. Exercise Solutions

EXERCISE 2.20-A Identify the DOE Order that assigns responsibilities and authorities for the Department's EMS.

ANSWER 2.20-A DOE Order 5500.1B establishes the Department's EMS.



EXERCISE 2.20-B Identify the role of the field element in an operational emergency.

ANSWER 2.20-B During an operational emergency, the cognizant field element is responsible for the following:

1. Ensuring prompt initial notification to state, tribal, and local governments and others, as appropriate
2. Ensuring proper response by facility managers to any emergency within their facilities
3. Providing additional technical assistance and support
4. Monitoring the facility response activities and recommending additional actions, as necessary
5. Predesignating an On-Scene Coordinator for Federal responses under the National Contingency Plan (NCP)
6. Ensuring emergency response actions are coordinated with the cognizant local, state, tribal, and Federal regional organizations
7. Coordinating additional DOE and other Federal agency resources, as required
8. Overseeing the local investigation and closeout of the occurrence, in accordance with the HQ Program Manager

EXERCISE 2.20-C Describe the organization and function of the EMT at the HQ level.

ANSWER 2.20-C The HQ EMT consists of an executive team and a technical operations cadre. The executive team provides strategic direction to the response and evaluates the broad impacts of the emergency on the DOE complex. The executive team is normally chaired by the Under Secretary, with the cognizant PSO serving as the Deputy Chair.

The technical operations cadre, which consists of several designated PSOs for nuclear and nonnuclear programs, provides oversight to the field element; coordinates with other Federal agencies; and provides information to the press, Congress, and other Federal agencies.



EXERCISE 2.20-D Define the term “operational emergency.”

ANSWER 2.20-D Operational emergencies are significant accidents, incidents, events, or natural phenomena that seriously degrade the safety or security of DOE facilities. Operational emergencies apply to DOE reactors and other DOE facilities (nuclear and nonnuclear) involved with hazardous materials; DOE-controlled nuclear weapons, components, or test devices; DOE safeguards and security events; and transportation accidents involving hazardous materials.

EXERCISE 2.20-E Describe the membership and the function of the EMAC.

ANSWER 2.20-E The EMAC, chaired by the DEO, consists of individuals with emergency preparedness responsibilities, appointed by and representing the cognizant HQ PSOs and heads of field elements.

The functions of the EMAC are to assist the DEO in the identification of problem areas related to the DOE EMS, provide recommended solutions to such problems, and assist with the development of policy and technical recommendations to enhance and implement the DOE emergency preparedness program.

EXERCISE 2.20-F The requirement for establishment of EOCs is found in which DOE Order?

ANSWER 2.20-F The requirement for the establishment of EOCs is found in DOE Order 5500.2B.

EXERCISE 2.20-G Explain the differences and relationship between “occurrence reporting” and “notification” as contained in DOE Order 5000.3A, *Occurrence Reporting and Processing of Operations Information*, and DOE Order 5500.2B, *Emergency Categories, Classes, and Notification and Reporting Requirements*.

ANSWER 2.20-G The purpose of occurrence reporting under DOE Order 5000.3 is to document events and provide for appropriate corrective action. The purpose of reporting under 5500.2B is to ensure that appropriate response actions can be undertaken and that appropriate resources are available to mitigate the emergency.



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DOE Order 5000.3A provides requirements for reporting event occurrences. Reportable events are categorized as Off-Normal Occurrences, Unusual Occurrences, and Emergencies. Once an event has been categorized under 5000.3A, oral notification to HQ and off-site agencies must be made within 2 hours of categorization for an Unusual Occurrence and within 15 minutes for an Emergency; written notification is required within 80 hours of the categorization.

If an event is categorized as an Emergency, it is further classified as an Alert, Site Area, or General Emergency by 5500.2B, and oral notification is required within 15 minutes of declaration of the emergency.